NEW-YORK FARMER,

AND

AMERICAN GARDENER'S MAGAZINE.

"Agriculture at once the cause and evidence of civilization."

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D. K. MINOR, and GEO. C. SCHAEFFER, } EDITORS AND PROPRIETORS.

FOR MAY 20, 1837.

NEW SERIES—VOL. V.

NEW-YORK FARMER.

MAY 20, 1837.

THE NEW-YORK FARMER AND AMERICAN GARDENERS' MAGAZINE,

Will be *hereafter*, for the *remainder of this Volume*, published *semi-monthly*, in numbers of sixteen pages each. It has *heretofore* been published in *monthly parts*, *stitched*, and of course subject to *pamphlet* postage, which is, with many, an objection to the work; and *others* desire to receive the work more *frequently*. In order, therefore, to obviate this objection, and to gratify this reasonable desire, especially at *this* time, when agricultural pursuits are becoming more fashionable with many of our citizens than heretofore, we have concluded to commence the publication *semi*-monthly, and to send it to subscribers in the form of most *other* agricultural papers, without cover.

This arrangement will enable us to appropriate a small space in each number to advertisements, and we therefore solicit such as are appropriate, and may be desired by readers of agricultural publications.

To our co-laborers in the cause of AGRICULTURE—the great cause of our prosperity—we offer the use of our columns to extend a knowledge of their publications; and in this and succeeding numbers several of them will find the *terms* of their publications. Will they do us a similar favor?

☞ Gentlemen who receive this number will confer a *special* favor by aiding us in *extending the circulation* of the work. We also desire to *urge* upon our readers and others, who take an interest in the improvement of agriculture, the importance of communicating for publication, such facts, within their knowledge, as may be useful to others, engaged in cultivating the soil, without much experience. *Small matters*, or those which, to some, appear so, are of great importance,—and at this time of general depression, when many inexperienced men may fly from the uncertainty of commercial and mercantile life, to the more sober and practical pursuits of agriculture, it is of vast importance to them at least to be able to learn by *reading*, how those labor and manage who have been bred to the pursuits of agriculture. To such men agricultural publications are as the *compass*, *chart*, *beacon* and *lighthouse* to the marriner; and they are becoming more justly appreciated than heretofore, as they should be; for no person derives more benefit from *reading* than the farmer who avails himself of the agricultural publications of the day.

The following article was designed for the May number, but it did not reach us until that number had been forwarded to subscribers. In relation to the *hoe* referred to, we shall be pleased to show a sample of them at this office.

BURLINGTON, N. J., WEEDING HOE. This instrument, which is an improvement of the hoe, passing by the several names of "French or Dutch Weeding Hoe, Shuffle, and Lazy-back," was invented about twenty years since, by Mr. Nathan Stowell, of this place, and has within a few years past, been introduced into the gardens of Horace Binney and Charles Cnauncey, Esqrs., Henry Carey, Haverford School, and many others, and is highly approved of wherever known. Setts of these hoes may, probably, be procured of Geo. Thorburn, No. 11 John-st., New-York, who has been furnished with a sett as samples for any good smith to imitate. In making them, care should be taken to punch rivet-holes through the sawplate *without heating it*, so as to retain the temper of the plate. Both this hoe, and the Burlington hand "Weeding Fork," are worthy the attention of Gardeners.

T. C.

Burlington, N. J.

We are truly obliged to M for this continuation of the subject commenced in our last. His views, opinions and experience, are entitled to high respect.

For the New-York Farmer.

MANAGEMENT OF SHEEP.—No. II.

MESSRS. EDITORS,—With your approbation I will resume the above subject, commenced in your last number. In that communication I endeavored to establish the first, and most prominent advantage, derived from adequate protection afforded to sheep during the winter season, viz., *the saving of life*. I shall comment further on this head, and mention other advantages, founded upon my own experience, although fully confirmed by the experience of thousands before me. I arrogate to myself no claim whatever for any new discoveries, but merely have followed the lights which others have discovered and set up: my object is, only, to bear testimony to the correct bearings of those lights, and assure all my agricultural brethren that they will invariably lead to the harbor of *true interest*. I know to well, from my observations, that the proclamation of a truth, and that sounded but once, is like the fall of a solitary drop of water upon the rock,—it is only by its thousand repetitions that an impression is made. Having this in view, it serves as my only foundation for hope that my reflections, trite as they are, yet having the merit of being based upon facts, will not be altogether passed by like the idle wind. We have indeed fearful and gloomy times upon us already, and a dull prospect of immediate amendment, and it therefore behoves every farmer to be awake and diligent in every department of his calling. Our duty is to practice economy; not simply that economy which, according to common acceptation, consists in saving shillings and pence, but adopts all wise and salutary means for saving our stock from premature death.

In my former communication, I stated that the severe winter of 35 and 36 caused a destruction of sheep in this quarter which was unprecedented,—that many with flocks similar in size to my own, lost hundreds upon hundreds, while my own loss, in consequence of being well provided with shelters,

was only 38 out of 1500,—that previous winters, and when my flocks were exposed, my loss varied from 50 to 150. As the foddering season is over, (truly a long one has it been,) and my sheep turned upon the fields, I will state the result of last winter's operations. Of lambs, having wintered nearly 500. I have not lost one. They were grained from the time they were put in winter quarters to the 25th ultimo; and here I will with pride state the fact, that for the number, as regards uniformity of size, and good flesh, their equal will hardly be found in the state. Of grown sheep, out of 1300, 17 have died. six or eight of which was from old age. This, a thorough and critical wool-grower will not allow is good management, in permitting *old sheep* to die on my hands. I admit it; and my practice is, to select in the fall all inclining to old age and poverty, and put them by themselves, and in the spring or early in the summer, make sale of the flock with their lambs. The few of this description which died, were reserved last year on account of their fineness of fleece, and a wish to retain their lambs.

But, this inquiry will perhaps suggest itself to some sceptical readers of your Journal, whose self-sufficiency causes them to regard their own mode of management superior to every one else, and who perhaps think sheltering of sheep, among other things, mere *fudge*, viz., whether my sheep were not in better flesh at the beginning of winter before the last, when so many of my neighbors lost their hundreds upon hundreds, while my own loss was less than forty? and further, were mine not naturally more hardy? I answer, that I saw parts of several of the flocks mentioned, late in the fall, and then they were fully equal in flesh to my own; and also, that they are the same grade of sheep, and therefore no material difference of constitution. I call my own flock *Saxons*; but some of your readers, will better understand their grade, by naming the price I have obtained for their wool. It has been purchased in Boston for the Middlesex Company the last three years: the two last clips I received a little less than 75 cents per pound. So it must be the legitimate conclusion, drawn from all the facts I have stated above, and in my former communication, that in *saving of life*, my success is almost entirely to be ascribed to sheltering.

I will now briefly speak of another advantage, or rather consequence, resulting from protection of sheep; viz., *the prevention of disease.* I know it is difficult to get at facts to prove this; but your readers perhaps can gather the proofs of my position, as I have satisactorily done, by reasoning from analogy,—from "man to brute." Will not exposure to the rude storms of winter and spring have a tendency to engender disease?—and if not active disease, will it not so affect the constitution that it is liable to curtail several years of their existence? Every candid and experienced wool-grower will answer in the affirmative. I leave, however, what is in some measure speculation, and turn to facts—for facts are truly stubborn, and I like them the better for it.

If there be any who doubt that sheltering of sheep will perfect and improve the quality, I will suggest a cheap method by which it can be thoroughly tested. Select in the fall two sheep of equal quality, as regards wool; jacket one of them, as it is called, by covering the body of the animal with an oiled or painted canvass, in order that it be impervious to rain, and let it be kept on, until shearing. Allow the other to go at large, without jacket or shelter, and the result, after comparing the two fleeces, will clearly establish the point in question. But the improvement of fleece is too important to be passed over lightly: I will, therefore, having my Invoices at hand, give the result as stapled in the Middlesex Manufactory at Lowel, exhibiting the clips of '35 and '36. It will be remembered I stated, that, the winter of '34 and '35 my sheep were not sheltered. I sheared about 200 more in '36 than in '35, and those I disposed of during the interim of the clips, consisted, mostly of sheep inclined to age and not altogether my coarsest.

Clip of 1835.				Clip of 1836.			
3	lbs.	Wool	extra.	12	lbs.	Extra.	
62½	"	"	prime	186	"	"	prime
743	"	"	1st	1470	"	"	1st
1092	"	"	2d	1169	"	"	2d
1058	"	"	3d	879	"	"	3d
260	"	"	4th	199	"	"	4th
72	"	"	5th	37	"	"	5th
12	"	"	6th	9	"	"	6th

By a comparison of the above, it will be observed, that the stapling of the last clip shows a considerable increase of the higher qualities, and from what is above stated it is clearly proved that the difference is mainly to be ascribed to warm shelters.

But want of time urges me to close this communication. I hope I have sufficiently demonstrated to the sceptical portion of your readers the great importance of protecting their sheep from the inclemency of winter. If their own interests, together with what I have represented, based as it is upon experience, will not convince, as well as arouse to action, I know not what will.

May 2d, 1837. M.
Lansing, Tompkins Co., N. Y.

HOVELS FOR SHEEP.—Our worthy friend M has favored us with another article on sheep-husbandry. It is a subject well worthy of more general attention than has been usually given to it; and we shall not, *willingly* waive any claim which we may *have* made, or which we may hereafter *make*, upon M, in relation to this, or any other *agricultural* subject, though we shall not hand the drafts to the "District Attorney," even if not *honored*.

HOVELS FOR SHEEP.—No. III.

The reason, doubtless, why many neglect to provide shelters for their sheep during winter, is generally to be attributed to the expense. To all those who neglect this important matter on this account, I will suggest a simple and economical mode of building them. When securing hay, if stacked out, build two pens, for the reception of the bottom of the stacks, four and a half feet high, and place them about thirty-five feet apart, in, or nearly, an east and west line. Then take two poles of sufficient length to reach from pen to pen, and rest the ends on the top of each pen; the centre of the poles to be supported by crotches, and well secured in the ground. A sufficient number of rails or poles will then be required to support the straw, which will be necessary for a covering; a plentiful supply of which should be used in order to absorb rain, and prevent leakage. I will also suggest, that the straw ought to be secured by placing a few rails on the top of it, otherwise violent winds will displace it. The rear of the hovel, which of course should be the north side, can be made of boards, and must be perfectly tight; if it is not, snow when drifting will be certain to find its way in, and often occasion the trouble of removing it. If boards can not be readily obtained for the back, racks, made of rails or poles, and stuffed with straw, will answer quite as well, and perhaps rather better, inasmuch, if they are well made, the hovel will be warmer.

I also recommend the erection of several racks, to be filled with straw, called "wind breakers." I will not mention where they ought to stand, as practical farmers know pretty well the point a northwester is apt to bite hardest. Old and partly rotted straw will answer all the above purposes the better. The size of the hovel, as described, is calculated for 100 sheep. M.

Lansing, Tompkins Co. N. Y.

Although not designed for publication, we give the annexed P. S. for the benefit of all concerned.

P. S. I now will mention some mistakes which your '*devil*' made in printing my first communication, which I beg you to correct in your next No. I am a great friend to order, and like things done just right.

You make me say "*created* board fences"—it should be "*erected* board fences"

—and following on as printed, "this however *it* the fact"—should be "*is* the fact" —and "*in* the saving of hay"—should be "*is*" &c And towards the conclusion—printed "*get* so absolutely neglectful"—should be "*yet* so" &c.,—"will not my *preparatory* remarks" &c.,—should be *prefatory*"—"these are the very kind of farmers referred to who *regret* all experiments" &c,—should be "*reject*" &c.—there are some others too small to notice, the first and last are the only ones necessary to correct.

I am afraid, as the more busy season with farmers is at hand, that all your drafts, that is, *monthly* drafts will not be *accepted*. But I have the great cause of agriculture so much at heart, and so much desire its prosperity, that I am willing to contribute my feeble efforts towards its promotion, either by verbal or written, reflections drawn from the great well of experience and truth.

M.

For the New-York Farmer.

AGRICULTURAL TOUR.

No. 4.

Tonawanda is a small stream flowing into the River Niagara about twelve miles above the Falls. It is dammed at its mouth and is used for several miles as part of the Erie Canal. A considerable village is growing up at the mouth of the river, nearly opposite to Whitehaven on Grand Island; and the timber from Grand Island, destined for the New-York and Boston shipyards is here admitted into the Grand Canal. The railroad between Buffalo and Niagara Falls passes through the village; and in future passengers in the Canal packets will probably disembark here and take the cars to Buffalo by which means a distance, which by water occupies about three hours will be passed over in less than an hour, 3 quarters of an hour will ordinarily be deemed sufficient; a great and most valuable gain to travellers. The river Niagara, at the entrance of the Tonawanda into it, presents deep water and a secure anchorage for large vessels, which may be employed in navigating the Lakes; but the difficulty of reaching the Lake against a strong current and some difficult rapids, excepting under peculiarly favorable winds or very strong power of steam may be thought to present strong obstacles to its use and improvement as a port of shipment. These however, will be easily overcome by steam power; and availing of the ship canal at Black Rock. This and Whitehaven, must from the facility of procuring the best of timber in the immediate vicinity, offer a most favorable situation for the building of vessels. The village is destined to extraordinary prosperity from its advantageous situation and the great improvements now in progress. The land in the vicinity of Tonawanda is of an excellent description. As far as the backwater of the creek extends, a distance of three or four miles, this circumstance is prejudicial; the cultivation in some places being necessarily hindered, and the general healthiness of the country has been supposed to be affected. The latter circumstance however, is becoming obviated by clearance and cultivation. But when the land is not so affected the soil is eminently favorable to wheat, oats, potatoes, and grass. Indian corn is sometimes cultivated with success but it cannot be considered a safe crop. The soil is improved by cultivation. The whole country is of calcareous formation: loam resting upon limestone and intermixed with limestone, gravel, which in the form of a carbonate is seen intermixed abundantly with the soil in small grains. These being brought to the air by the plough become decomposed; and the soil in this way acquires constantly increased blackness and fertility. Pease are a favorite and very productive crop. On visiting one of the best farms in the neighborhood of the creek, the farmer informed me that his crop of wheat usually averaged from twenty-five to thirty bushels per acre; of pease thirty bushels; of grass one and a half to two tons per acre. He uses no manure for his land excepting that he has spread some on his grass land; and he showed me a field which with the exception of three intermediate years, had been in wheat thirteen years without a diminution of the crop. I have perfect confidence in the honor of the gentleman who made these statements, but possibly there may be some little unintentional overstatement; as it almost always happens, where crops are not matter of exact measurement, but of estimate or conjecture merely, there is a tendency to overstate. A crop of wheat certainly without very careful cultivation, averaging from twenty-five to thirty bushels is quite large. The aftermath in the fields was short; and by no means a fair test of what the land is capable of being made to do. The farming in most parts of this country was inferior and slovenly; and the regular introduction of clover, with all the grain crops and the ploughing it in, would produce a most favorable and extraordinary change in their condition. Speculation however, is so rife, other means of procuring money seem to promise so much quicker returns; and labor is indeed so difficult to be procured, and withal so expensive and troublesome, that mere cultivation, it is to be feared, will continue to be regarded as a secondary interest. The passage of the Canal through this country, and the multitude of canal boats, which seem to pass and repass in an almost uninterrupted succession, afford a ready and cash market for all the produce of their farms.—Their wants even then are but imperfectly supplied. The growth of the country here is in many places magnificent—oak, black-walnut, maple, whitewood and elm, of the largest description. Most of the wood, which is cut here, is sent to Buffalo, or sold at the Steam Saw Mill on Grand Island.—Much of that which is suitable for timber is sawed at the same establishment for this purpose.

The ride from Black Rock to the Niagara Falls, by the side of the Niagara River, is extremely beautiful; the expanse of water, the several fine islands skirted with rich foliage to the waters edge, and the excitement of an approach to the Falls, which it is not easy to suppress, though you may have visited them repeatedly, render this jaunt exceedingly interesting and delightful. The ride for some miles below the Falls towards Lake Ontario increases in picturesque effect; and presents many points of view, embracing the Falls themselves, the wonderful passage of this torrent through its walls of natural masonry, which it would seem, must have occupied centuries, not to erect, but to excavate and widen, the compression of the torrent before it branches into the whirlpool, where owing to the narrowness of the passage, and the velocity with which it is forced onward, the central ridge of waters like the roof of a barn is elevated at least ten feet above the edge of the waters at the shore; the whirlpool itself, and afterwards the whole course of the river until it enters into Lake Ontario, which is seen distinctly from the high grounds, and lastly the magnificent and glittering expanse of the Lake itself, present a succession of views unrivalled and enchanting.

The land on the shores of the Niagara River from Tonawanda to a distance of three miles below the Falls as far as my ride extended, is similar to what I have already described excepting that in some places the clayey portions predominate much more here than in others. A good deal of this land has been a long time cleared and the stumps removed. It is much of it of a very fine character for wheat. A highly intelligent gentleman of the village at the Falls, who accompanied me, showed me a field which with the exception of one year had been for thirty years in succession in wheat, without manure and without any apparent diminution of its fertility. Twenty to twenty-five bushels of wheat are consid-

ered an average yield; thirty are often obtained. The first ploughing is generally shallow; afterwards deeper ploughing improves the soil. Plaister and clover have not yet been tried. Improvements are in progress and a spirit of enterprize awakened, united with intelligence, from which the best effects will result; and which must soon put a different aspect on the whole face of this splendid country; for which in respect to picturesque scenery, nature has lavished her gifts in prodigal and almost unrivalled profusion.

Opposite Tonawanda, and lying along in the river for a distance of about nine miles, is Grand Island, a magnificent tract of land of an average width of four miles, and containing about eighteen thousand acres.—The Northern extremity is in sight of the the rapids of the Great Falls, though steam vessels and others cross far below it from the American side to Chippeway on the Canada shore. A small portion of the Island is at present cleared; and the remainder is covered with a noble growth of the most valuable white oak timber, black walnut, and other wood. The surface of the Island presents few inequalities and the highest point is but few feet above the river, in the middle of which it is situated; and which furnishes deep and excellent ship channels on either side. The soil is excellent, where it has been brought into cultivation; some of it being alluvial and the rest a rich loam with an intermixture in greater or less measure of clay; suitable for wheat, oats, grass, and succulent vegetables; and if the beet cultivation for sugar should be pursued to any extent, eminently adapted to that product. It is likewise extremely well suited for dairying and grazing. The land hitherto being held in common, and the objects of the company being mainly the getting of ship timber to market, small attention has been given to agricultural operations and improvements. I was much gratified here in looking at the barn above 100 feet in length erected by Lewis F. Allen, Esq., near the village of White-haven for the keeping of the numerous ox-teams employed in the saw mill at that establishment. The barn is entered lengthwise, and the great floor extends through the whole. The mows for hay are on each side of the floor; and leantos, or close sheds are projected from each side of the barn for the whole length, which furnish stables for the cattle. The whole is well contrived considering the flat situation in which it stands; and the teams and every thing connected with the establishment, in excellent and farmer-like condition. I shall forbear a more particular account of it, as I hope at a future time to receive it from Mr. Allen's own pen.

H. C.

STATISTICS OF GREAT BRITAIN.

STATISTICS OF THE BRITISH EMPIRE.—A highly valuable work on this subject has been recently given to the public by James McQueen, and dedicated to the Duke of Wellington. We infer from this circumstance that its authority may be relied upon; and we believe that many of its details, especially as far as they relate to agriculture, come within the province of this work; and will be interesting and instructive to our readers. Statistical facts are always valuable; but we do not think in this country sufficiently appreciated. They alone enable us to form any think like an exact opinion of the actual condition of a country, its actual wants, its actual capacities and improvements. They are extremely useful to the age in which they are given; and they remain as most important documents of reference to all succeeding periods. With respect to many matters of national policy and legislation, they are the only safe grounds of action; and the most serious mistakes have been made for a want of this knowledge. In many subjects of statistical detail, perfect accuracy is not attainable. Changes are perpetually occurring, and allowance for these changes, in the shape of what sailors call 'dead reckoning,' must be made. But even a tolerable approximation to the truth is infinitely better than mere vague guesses or conjecture. The extreme difficulty and labor requisite in procuring such details can be but very imperfectly estimated by those who have made no experiments of this kind; the difficulty of superintending the press in such cases, so as to insure accuracy, is not inconsiderable; extreme candor is to be shown and the highest credit is due to those who busy themselves in this severe and humble labor; and present the results to the public eye with all the accuracy which extreme diligence an pains taking can secure. This work, though compressed into a thin octavo, could not have been executed in the manner it has been done, without application to numerous, various, difficult and distant sources of information. We shall make such few extracts from it as may be most likely to command attention.

The rents of land in England, vary from 20*s.* to 3*l.* sterling per acre. In Scotland, from 20*s.* to 7*l.* per acre. The latter very high rents are in the finely cultivated districts of Mid Lothian, and probably in the neighborhood of city markets. The average rent is put at 25*s.* to the acre. Rent in Ireland, on land manured for a crop, is 9*l.*; not manured 2*l.* to 3*l.* The average rent in Ireland is put down at 23*s.* per acre. Land in Ireland sold for thirty years, we should rather say leased, is calculated to yield 3½ per cent. Rent of sheep pasture in Scotland, is from 3*s.* to 6*s.* per acre. The wear and tear of horses is estimated at one-tenth; so that there is a complete absorption of this species of capital once in ten years. This fact, if well established, has a most important bearing upon the question of the comparative expediency of employing horses or oxen for farming purposes; the former a deteriorating, the latter when properly managed, an improving capital. This single circumstance of difference will not however by any means decide the question. Many other matters are to be taken into the account, and at present we forbear a judgment.

HORSES.—The whole number of horses now owned (1832) in Great Britain 1.412,797. Add for Ireland one half more 706,398. Total. Great Britain and Ireland 2.119,705. We have in a note some other details. The number of horses in the Prussian provinces was in 1825—Horses 1.202,642. Colts, 199,706. Total, 1.402,348. The number of horses in France is stated to be 2.400,000. The estimated value of riding and carriage horses in England, is 40*l.* each—of horses for agricultural purposes, 25*l.* each. Total value, £60,630,130 sterling—a considerable capital to be literally *worked up* once in ten years.

BLACK CATTLE.—The number of Black Cattle in the United Kingdom is estimated at 15.000,000. According to the agricultural report of 1833, the value of cows bought, is from 13*l.* to 15*l.*—and of oxen, working, 14*l.* to 16*l.*, and of those sold from 18*l.* to 20*l.* The wear and tear, or loss in cattle annually, is reckoned as in horses, about one-tenth. The absolute loss of one-tenth of black cattle, by disease or accident, so as to be worthless, excepting for their hides, as of horses, in a year, must, if so understood, be a great overstatement. The total number of cattle and calves slaughtered in London in the year 1834–5, was 177,000. The average weight of the cattle was 880 lbs. each. The number slaughtered in Liverpool, Manchester, Leeds, Sheffield and Birmingham, according to the Agricultural Report of 1821, was yearly 47,859 cattle, 668 lbs. each; and 52,448 calves at 90 lbs. each. The number killed in Ireland to procure salt-beef must be great, when it is known that reduced as that salt-beef trade is, still the quantity exported to all foreign parts was in 1825, 73,135 barrels, or 219,305 cwts., equal to at least 30,000 of the

heaviest oxen alluded to. The Kyloe breed of cattle in the West Highlands are very numerous; thousands of these cattle are fed, and fattened, and slaughtered yearly in every part of Scotland and England; their price is very high; three years old, 13 to 14 guineas each in 1816. The total number, classes, and value of black cattle, thus: Bulls, young and old, 500,000. Cows, do., 7,000,000. Oxen, &c. fattened to kill, 2,000,000. Oxen growing up for fatting, 4,000,000. Oxen, used to work, 500,000. Cattle to supply wastage, 1,400,000. Total, 15,400,000. The total value, which, at 14*l.* per head, we think must be an over-estimate, is set down at £215,600,000.

A note here, in giving the modes of keep in some places, states that in Jutland a cow yields from 64 to 84 lbs. of butter; in Holland, the same; in Zealand, less milk given to calves, 84 lbs. do. A horse has weekly 84 lbs. of straw, 56 lbs. of hay; 88 lbs. of barley or 96 lbs. of oats. A cow of middle size daily 8 lbs. of straw and 8 lbs. of hay during the 220 days she is in the stall. When fed with potatoes, must have 52 lbs. per day, but with this, less straw and hay. From seven to ten sheep consume as much as one cow during 180 days they are housed. The number of black cattle in the United States in 1827, was estimated at 14,000,000. By what means this estimate was formed, I am unable to say.

Poultry and Rabbits.—"The amount of capital vested in these two species of agricultural stock is of no mean importance; and much more considerable than is generally thought. According to the Times newspaper, Nov. 20, 1835, the consumption of poultry in London for the year was about 80,000*l.*, and rabbits 14,000*l.* On the same scale for the kingdom, the value of the former would be nearly 1,000,000*l.*, and the latter in number 168,000, and the value 84000*l.* The skin of the rabbit is very valuable, being double the value of the carcase. At Dunfries' February fair, 30,000 rabbit-skins have been sold. In Feverham, rabbits and pigeons are very numerous. In the district of Brundon, Suffolk, are 350 pigeon houses; here also 40,000 rabbits are produced yearly. The Agricultural Committee of 1833, sets down the produce of pigs and poultry on a farm of 100 acres at 20*l.* annually; this, taking the farms wholly arable at 490,000, gives 9,800,000*l.* yearly, which sum, even on this scale, must be more than doubled, for the poultry, &c., raised by sheep farmers, and all other classes, who keep poultry; also it must be taken into the account that the above produce, at 20*l.*, is exclusive of the value consumed on the farms, &c., which, say one-fourth, would give for pigs and poultry, a consumption annually of about 25,000,000*l.*, leaving for poultry about 2,500,000*l.*; and admitting that stock is in the proportion of four-fifths to the produce, we have a capital of 9,000,000*l.* or 10,000,000*l.* invested in poultry, rabbits, &c., which, great as it is, is probably very near the truth. When we look at the immense number of eggs, brought from Ireland (50 tons of eggs and 10 tons of live and dead poultry being shipped from Dublin alone in one day) and 66,000,000 eggs, imported from France for London alone; and this immense number, a trifle certainly to what are produced in this country, we shall cease to wonder at the large capital here stated to be invested in poultry of all kinds. The quantity of eggs imported into Liverpool from Ireland in 1832 was 4097 crates, value 81,940*l.*, which at 6*d.* per dozen, gives 3,777,600 dozens, and the number 39,331,200. The number imported into Glasgow from Ireland, in 1835, by the Custom-House entries, was 19,321 cwts.; at nine to a pound gives 17,459,568. In 1833, the import has increased to 7,857 crates, or upwards of 70,000,000." Of sheep and swine, we shall give further details on a future occasion.

Produce of one Seed.—Extract from proceedings at a late meeting of the Northamptonshire Farming Society in England:

Mr. Hillyard then produced his bag of turnip seed, for which a great scramble took place amidst much laughter. He observed that one of the advantages of these turnips was, that they would not run to top, if allowed to stand till late in the year. He had seen turnips in April run to top until they resembled a painter's brush. As an evidence that they were well worth attending to, he would mention that some time ago, he was walking over a turnip field in a distant county, when he perceived that the turnips were exactly the same sort as those he was now showing. Upon mentioning the fact to the owner, he confirmed it, adding that his son had obtained *one of the seeds* handed round by him after the dinner of the society; that he had sown it; and liked it so much that he preserved the produce; and had now his farm stocked from that insignificant origin.—[B. Farmer's Magazine, Oct., 1836.

Death of Rev. Henry Berry.—By a late number of the British Farmer's Magazine, we have the painful annunciation of the death of the Rev. Henry Berry, for some time the editor of that useful publication.—He died on the 24th August last. He was eminently distinguished as a scientific and practical farmer; for the zealous aid which he was always ready to lend to the farming interests; and particularly for his able defence of, and his long and distinguished success in improving the breed of improved Durham Short Horns. The death of such a friend of agriculture is a serious public loss.

H. C.

From the Quarterly Journal of Agriculture.

STUDIES IN THE SCIENCE AND PRACTICE OF AGRICULTURE, AS CONNECTED WITH PHYSICS.

Chance may do much in the discovery of facts, and the invention of means, as when Mr. Nutt discovered the only range of temperature at which bees swarm, and the idle boy, by tying a string to the valve of the steam-engine, invented an ingenious mode of making it work without his continual assistance. Yet it often requires much sagacity to turn to beneficial or practical account such discoveries as are made by accident or chance observation, and even men of the highest talent frequently fail in this. Dr. Lister, the celebrated English naturalist, states certain facts with regard to fossil shells that would almost induce a belief of his having had more than a glimpse of some of the most important doctrines of modern geology. These facts, it does not appear that he followed up to any general induction, which was done almost a century after his time, without, it is believed, any hint having been derived from his statement. Lord Kames, in his very clever book, the "*Gentleman Farmer*," by a chance remark, most distinctly shows that he was on the very brink of anticipating the important discovery of the excrementitious discharges of plants into the soil, recently proved beyond all question by the experiments of M. Macaire of Geneva.*

Chance observations, however, though they should be of the greatest importance, are frequently lost, sometimes for want of being recorded, and sometimes from the observer's being incompetent to see their various bearings. Mr. Nutt might have contented himself with merely announcing, in some scientific journal, his having discovered that bees will not swarm except at a particular degree of temperature, without applying it practically, as he has done, to increase the population of the hives by always preventing artificially the natural process of swarming.

Lord Kames, on the other hand, only mentions it as probable, from the analogy of animals, that plants *may* discharge something similar to excrementitious matter, without following up the idea experimentally, to prove or disprove the fact.

A more extraordinary instance may be given from the science of optics, as bearing upon practical subjects in agriculture, in a manner which could scarcely have been imagined by the most fanciful speculator. About a hundred and fifty years ago, the Dutch philospher Huygens, in his observations on Iceland spar, discovered a remarkable property of the rays of light transmitted through it,—a property which led Sir Isaac Newton to suppose each ray to have four sides or quarters causing it to be disposed in

* Quarterly Journal of Agriculture.

a particular manner. Here the matter rested till it was taken up by M. Malus, whose attention was attracted to the subject by one of those rare accidents which a common observer would have passed unheeded, but which, to a master mind like his, was productive of brilliant results. In 1808, while this philosopher was viewing with a doubly-refracting prism, a fine sunset reflected from the palace of the Luxembourg, on turning the prism slowly round, he was surprised to see a very great difference in the intensity of the two images, that which was most refracted being alternately changed from brightness to obscurity at each fourth part of a turning, or as opticians would say, at each quadrant of a revolution. From that period, Malus, Dr. Brewster, Fresnel, Arago, Biot, and others, have discovered facts "so singular and various," in the words of Sir J. Herschel, "that, to one who has only studied the subject of physical optics under its ordinary relations, it is like entering into a new world, so splendid as to render it one of the most delightful branches of experimental inquiry; and so fertile in the views it lays open of the constitution of natural bodies, as to place it in the very first rank of the sciences."

Some general idea of this may be given to the unscientific reader by stating, that when a ray of light from the sun is reflected from a piece of glass, polished metal, or other such substance, it will pass freely through any transparent body, or may be reflected from another surface, even when we turn round the body. But if a ray of light be reflected from plate glass at an angle of 57°, it is rendered altogether incapable of being reflected from the surface of another piece of glass, when turned in certain positions, though it may be reflected in other positions: and further, this ray will not pass through transparent substances turned in certain positions, though, when these are turned in other positions, it will freely pass through. Hence, it has been inferred, that the different sides of the rays of such light, as imagined by Newton, must have different properties in relation to the surface on which they are received, termed in optics the *plane of incidence*, and hence this sort of light is termed *polarized* light, on account of the sides of the rays being supposed to have, somewhat like a magnet, different *poles*. It is necessary to say, that the existence of such *sides* or *poles* is only conjectural, and not proved; but this does not in any way affect the results of the observation of facts connected with the phenomena.

One other property of this polarized light requires to be stated here. When reflected from a surface, the polarized ray is sometimes observed to go to the right, sometimes to the left, and sometimes more and sometimes less decidedly, on account of the nature of the substance used in the experiment.

Now, it is but natural for the agricultural reader, who has accompanied us thus far, to ask, What can all this minute observation and experiment on the rays of light and their polarization have to do with agriculture? Before we have done, we have no doubt that we shall most amply prove, not its mere theoretical, but its strictly practical importance; so that the reader may himself prove the correctness thereof in a very short period.

We are indebted in part for the facts to M. Biot, of the French Academy of Sciences, himself one of the most successful experimenters in the new science of polarization. Taking advantage of the tests afforded by substances polarizing light to the right or to the left, M. Biot instituted a series of experiments and observations for detecting the intimate constituents of certain vegetable substances, where chemical analysis failed, or at best was only imperfect or uncertain. From his researches by means of polarization, and those of M. Raspail with the microscope (another application of optics), we are now enabled to ascertain two kinds of facts of the highest importance to agriculturists, namely, *first*, What constitutes the nutritive principles of the food of animals; *secondly*, What constitutes the nutritive principles of the food of plants. The second is not yet quite so distinctly brought out as the first; but M. Biot, we are glad to learn, is continuing his researches. We shall now endeavor to give some account of the important discoveries in question.

Nutritive Principles of Animal Food contained in Grain and Roots.—Towards the end of the 17th century, the illustrious Dutch observer Leeuwenhoeck, in his microscopical researches, examined, among other things, portions of wheat flour, which we now know to consist of a various mixture of starch, gluten, oil, resin, sugar, and gum; and by one of those happy chances already exemplified, was led to make a shrewd conjecture respecting the real constitution of flour made from grain. In the wheat flour he found globules (*globuli farinarii*), each, as he supposed, furnished with a vessel, by which the plastic matter passes in order to produce other globules,—an optical illusion, as has since been shown; but in subsequently studying those globules, he shrewdly asks whether they be not enclosed, as in the case of seeds, in some sort of membrane. "I then," he adds, "used my utmost endeavors to discover the internal hidden make of the globules of meal, wherein, at length, to my great satisfaction, I succeeded."* He describes the grains of wheat as principally composed of those minute globules which are singly transparent, and he closely compacted within a kind of membranes, so exquisitely thin and transparent, that in some places their texture is not to be discerned. M. Biot has said, that Leeuwenhoeck observed the grain of fecula (rather farina) to be composed of a vesicle and a soluble substance, which is its nutritive part, since nothing but the shells or husks are met with in the dung of animals.

Now these observations of Leeuwenhoeck were lost sight of, as that of Huygens had been relative to the polarization of light, till, eight or ten years ago, the subject was taken up by M. Raspail, apparently without being aware of what Leeuwenhoeck had published, and he has so simplified the views of the constituents of the nutritive principles contained in farinaceous substances, as to render them, when conjoined with the researches of Biot, Persoz, Pelouze, and others, of the highest interest to scientific agriculturists.

It may be remarked, in passing, that M. Raspail* endeavors to show that Leeuwenhoeck's observations afforded not even a glimpse of his own discoveries, and that M. Biot has misunderstood or misrepresented his meaning. In the quotations from Leeuwenhoeck above, however, which we have given in Hoole's excellent translation, it will be seen that M. Raspail himself has not translated unbiassedly. Hoole was dead before Raspail's discovery. From the experiments of M. de Saussure, it was believed that he had procured the chemical basis of starch, which he termed *amedine*. This amedine may be procured by boiling starch in a large quantity of water, throwing it on a double filter; and by boiling again the matter remaining on the filter, filtering again, and drying the residue. The substance thus obtained, after repeated washings and dryings, is in irregular white, or yellowish-white fragments, very friable, and without taste or smell. M. Saussure said this formed with potass a non viscid solution, was insoluble in water below the temperature of 140°, and did not form a jelly with boiling water. But M. Raspail shows, that what was supposed to be a solution in water at 140°, is only a suspension. Saussure failed most signally in discovering the nutritive basis of starch, which he ought to have sought for, not on the filter, but in the liquid which had passed through the filter.

Berzelius is no less in error than Saussure, when he states, as quoted by M. Raspail (*Chimie Organique*), that starch or fecula is composed of small crystals, which partly dissolve in water at an ordinary temperature. On the contrary, the microscope shows, that starch or fecula is composed of shining white smooth globules, quite insoluble in cold water, even when immersed for any length of time.

The globules of starch, indeed, consist of an envelope or shell and a kernel, if it may be so called, of a substance very different,—the chief discovery of M. Raspail, which serves to explain the errors and discrepancies of previous observers; for the envelope is altogether insoluble in cold as well as in boiling-water, and it is only what we shall for the present term the kernel is at all soluble. The partial solubility, therefore, observed by Berzelius, must have arisen from the accidental rupture of some of the envelopes by which means the water could obtain admission to the kernels.

Accordingly, when Berzelius states that starch is dissolved into a mucilaginous liquid by boiling water; Thenard, that fecula combines easily with boiling-water, forming a hydrate popularly termed starch; and Despretz, that, when fecula is mixed with boiling-water, it becomes soluble, and does not recover its insolubility in cold water, when evaporated to dryness,—they all

* Hoole's Select Works of Leeuwenhoeck, p. 179.

* Chimie Organique, *sub fin.*

speak vaguely, and in part incorrectly, from not knowing the discovery of Raspail already mentioned. The kernel contained in the globular envelope of fecula, consists of a gum-like matter, which, by the evaporation of its watery parts, becomes hard on exposure to the air. When immersed in water at 122°, the envelope, which is unaffected by cold water, expands, and in boiling-water it bursts, while the kernel is dissolved in the water. When the water is in large quantity, the envelopes detached from their kernels, and now ten times their original size, having free motion, subside; but when the quantity of water is small, they become mutually entangled, form jelly-like strata or layers, and render the water thick,—being what is termed starch in the laundry (*empois*).

M. Raspail, from numerous experiments, concludes, that each grain of fecula is an organized globule, formed in the interior of living vegetable cells, such as in those of a grain of wheat, or of the tuber of a potatoe; that the enveloping membrane of the kernel is incapable of being dissolved in cold water, spirits of wine, ether, or the acids, but expanding in proportion to the degree of heat, and in boiling-water bursting on one side of the globule; and that after boiling in a large quantity of water, the burst and detached envelopes fall to the bottom in the form of snow-white flakes, leaving the liquid above them as limpid as water.

With respect to the kernel contained within the envelopes, M. Raspail concludes, that if the limpid liquid be cautiously poured off, the addition of spirits of wine, the concentrated acids, or tincture of galls will coagulate it, but it will not coagulate by heat; that it acquires a blue color by adding iodine, a property it possesses in common with the envelopes, but it loses this property by being spread out thinly on a porcelain plate and dried, differing in that case in no respect from gum; and that it does not lose its characters on being dried by a moderate heat, which causes it more to resemble gum with a glass-like fracture, a splintery texture, and a shining surface.

We have M. Raspail's authority, then, for considering the kernel within the envelopes in starch as resembling gum, if not identical with it in physical and chemical characters, and hence we might be led to believe that the nutritive or soluble part is gum, or of the nature of gum. At this stage of the inquiry, however, M. Biot, along with M. Persoz, took up the subject, and succeeded so far in discovering a distinct and very remarkable difference from gum. Accordingly, on isolating the kernel portion of the parsnip root by boiling to burst the envelopes, precipitating by alcohol, purifying by repeated washings with alcohol, and then dissolving it in water in order to observe in what manner it polarized light, it was found that it turned the planes of polarization with more energy towards the right than any substance yet known; while all gums, and the sugar of grapes, turn the planes of polarization towards the left. Cane sugar, indeed, turns the planes of polarization towards the right, but not with the same energy as the kernels of starch. The latter, therefore, MM. Biot and Persoz term *dextrine*, and we shall adopt the term notwithstanding M. Raspail objects to it, till one more appropriate be proposed. The soluble portion accordingly of starch, or the farinaceous matter of grain and roots, is dextrine, which is always contained in a globular envelope, composed of membranes that are incapable of being dissolved in water even when boiling. By means of this singular and unexpected test of turning the planes of polarization towards the right of the observer, the nutritive qualities of all vegetable substances can be examined, and many of them have been so examined by M. Biot, as we shall presently see. Amongst other vegetable productions, M. Biot examined the juice of the carrot, taken from the white variety, by cold pressure. He divided this into two parts, one part being filtered through white paper without being heated; and another, after being similarly filtered, was brought for an instant to the boiling point. The result was most important in a practical point of view; the part which had been brought to a boiling produced a rotation towards the right exactly double of that which had not been heated, and its absolute intensity corresponded to the proportion of four per cent. of cane-sugar, as deduced from previous observation.

"The liquor," continues M. Biot, "treated with alcohol, gave a considerable precipitate, which was instantly redissolved in water, as is the case with dextrine, and this appears to me to explain sufficiently the sudden increase of the rotation after the boiling." It will follow that even a slight boiling doubles the nutritive quality of carrots, a fact known indeed from other experiments, but only in a vague manner, without any philosophical data to explain it by.

The juice of the turnip exhibited similar phenomena. When it was procured by simple pressure and filtered through paper, the portion which passed the filter exercised no ration that could be appreciated; but on boiling it with the pulp, a liquid was obtained, which turned the planes of polarization towards the right, indicating cane-sugar, as found in the turnip by chemical analysis.

In the juice of the beet-root, so interesting on account of the increasing manufacture of sugar from it, M. Pelouze, a young but able chemist, having found no grape-sugar, or such as is incapable of crystallization, and only cane or crystallizable sugar, M. Biot undertook experiments to investigate the subject still farther. Taking the fresh juice of the beet-root, he repeatedly measured with the greatest care the intensity of rotation which it communicated to polarized light, which he found to vary from 10° to 12° 6′, according to the difference of individual roots, or different parts of the same root, indicating from 11 to 14 per cent. of cane-sugar. The crown and the sides of the root being less mature than the centre, appeared to him to be less rich in the proportion of nine to ten. As the beet root on which the experiments were made had been taken from a field very liberally manured, the large proportion of saccharine matter, indicated by the intensity of the rotation, confirmed the remark of M. Pelouze, that the richness of the manure did not diminish the constituent quantity of sugar, though it renders it more difficult to preserve the roots. M. Biot seems to think that the large proportion of sugar might likewise be partly accounted for by the summer having been dry and hot. There did not appear to be any dextrine, for the white precipitate, perfectly soluble in water, and not coagulable by heat, did not affect the planes of polarization at all, and consequently this precipitate was neither albumen, gum, nor dextrine.

Dextrine was procured by MM. Biot and Persoz from laundry starch (*empois*) by acids cold or hot, strong or diluted, by potass, or by hot water, any one of which will rupture the envelopes, and set free the dextrine. Water alone, however, as M. Raspail proved, and MM. Biot and Persoz verified, will not completely rupture all the envelopes of fecula, or at least extract all the dextrine, unless the boiling is continued for a long time with considerable quantities of water; because the unbroken globules of fecula are apt to be held together in clots by the gum-like matter disengaged from the broken ones, and in this manner are partly protected from the full influence of the heat.

The dextrine thus obtained by any of the foregoing agents is uniformly the same, being completely decomposable by heat, while it can be analyzed into water, hydrogen, and carbonic acid gas, but no nitrogen has been found in it. When treated with yeast it undergoes the vinous fermentation, while acids change it into a saccharine syrup; but, when tried by the rotatory polarization of light, this syrup has a greater power in turning the planes towards the right than the sugar of starch in the proportion of ten to three.

Varieties in the unburst Globules.—Before the application of heat or any other agent to rupture the envelopes of the globules and set free the soluble dextrine, the globules themselves afford interesting objects of investigation, as will appear from the following important statement of M. Raspail. He tells us, (*Chimie Organique*, 134,) that in the Paris market he seldom found any wheat flour not to a certain extent mixed with potato starch, by which mixture the fraudulent dealer gains as much as 25 per cent. The potato starch has scarcely any effect on the appearance of the flour, and it requires experience and skill to detect it by the naked eye, unless the quantity of starch be considerable, when the crystalline appearance of the flour gives room for suspicion. The fraud, however, is readily detected by the microscope, and M. Raspail says he could thus discover the starch if it constituted only 1 per cent. of the flour. In examining suspected flour, it is always more easy to pronounce that it is adulterated than to tell in what the adulteration consists. The dimension and form of the globules, as given by M. Raspail, are the chief means by which such examinations can be made, and we think that no extensive dealer ought to neglect making himself thoroughly acquainted with these. He has only to furnish himself with a common microscope and a micrometer or glass plate divided by very minute lines like a foot-rule, and by laying a grain or more of flour on the micrometer, and examining it with his microscope to see how many lines it covers, he will be enabled

at once to tell the quality and kind of the flour in question. Micrometers divided so as to measure the $\frac{1}{10,000}$th part of an inch may be employed.

Potato.—The globules containing dextrine in this root acquire a larger size than any hitherto examined, being usually of from the $\frac{1}{10,000}$th to the $\frac{1}{1000}$th part of an inch, or even the $\frac{1}{10,000}$th part of an inch. When fresh they exhibit on the surface concentric wrinkles which disappear on drying. The form of these globules when large is oval; when small more spherical, the former being slightly contracted and bluntly triangular.

Wheat.—The largest globules rarely exceed the $\frac{1}{1000}$th part of an inch, or about half the size of the largest potato globules. They are of a round or spherical shape, and are much smaller when taken from half ripened wheat.

Barley.—The globules of barley are similar in appearance to those of wheat, but are much smaller, rarely exceeding the $\frac{1}{10,000}$th part of an inch.

Oats.—The globules of oats are oval and yellowish, being from the $\frac{1}{10,000}$th to the $\frac{1}{10,000}$th of an inch in diameter. The innumerable minute hairs of this grain give the meal a sort of cottony appearance to the naked eye.

Rye.—These globules are about the $\frac{1}{1000}$th part of an inch in diameter, of a flat form, somewhat sharp on the edge, and marked with a black cross or three black rays forming a central star, which gives a black color to rye flour.

Arrow Root.—The genuine arrow-root from Brazil may be distinguished from the starch of potatoes by boiling, which only produces in arrow-root an enlargement of the globules to four times their original diameter, because, as M Raspail thinks, they are exposed to heat in the original Brazilian preparation, while the globules of the potato expand to twenty or thirty times their original diameter.

The largest globules of genuine arrow-root do not exceed the $\frac{1}{10,000}$th part of an inch, and, like those of rye, exhibit through their translucid surface black lines like a star, or sometimes like the letter T. Potato starch is better than the genuine arrow-root.

Buckwheat.—The globules are yellow, and seldom appear so large as the $\frac{1}{10,000}$th part of an inch.

Maize.—Few of the globules attain the size of the $\frac{1}{10,000}$th part of an inch. The dried fecula is usually injured by grinding, being folded, wrinkled, and more or less rounded. When taken from the half ripe milky grain, they are smooth, entire, and quite round. Hence the dextrine of maize is obtained in greater proportion from the half-ripe seeds; and hence also the small proportion of starch found by the usual modes of chemical analysis, though it actually exist in the grain.

Peas.—The globules of peas are of the same form as those of the potato, with an unequal surface, and the largest are about the $\frac{1}{1000}$th part of an inch.

Beans.—The globules are of the same size as those of peas, but differ from being egg-oblong, or kidney-shaped, sometimes appearing as if a smaller grain were enclosed in the interior.

Other globules were examined and measured by M. Raspail, but these are the most interesting for our present purpose; and, before proceeding farther, it is indispensable to impress upon the attention of the reader,

1*st*, That the globules constituting meal, flour, and starch, whether contained in grain or roots, are incapable of affording any nourishment as animal food till they are broken.

2*d*, That no mechanical method of breaking or grinding is more than partially efficient.

3*d*, That the most efficient methods of breaking the globules is by heat, by fermentation, or by the chemical agency of acids or alkalies.

4*th*, That the dextrine, which is the kernel, as it were, of each globule, is alone soluble, and therefore alone nutritive.

5*th*, That the shells of the globules, when reduced to fragments by mechanism or heat, are insoluble, and therefore not nutritive.

6*th*, That, though the fragments of these shells are not nutritive, they are indispensable to digestion, either from their distending the stomach and bowels, or from some other cause not understood, it having been proved by experiment that concentrated nourishment, such as cane-sugar, essence of beef, or osmazome, cannot long sustain life without some mixture of coarser and less nutritive food.

7*th*, That the economical preparation of all food containing globules of fecula consists in perfectly breaking the shells, and rendering the dextrine contained in them soluble and digestible, while the fragments of the shells are at the same time rendered more bulky, so as the more readily to fill the stomach.

We hope these principles have been here put in intelligible and unequivocal language, so that they may not be misunderstood, seeing that they are of the very highest practical importance in preparing the food of all live-stock as well as of our own. But lest some of our readers of the old school, who are apt to reject most novelties as theoretical, should refuse to admit the truth of the deductions, it may be well to corroborate the results from actual experiments made by those who were ignorant of the very existence of the globules described by M. Raspail or the dextrine of M. Biot.

(To be continued in our next.)

A Northern correspondent shall be gratified in having the following four articles from the Cultivator transplanted into the New-York Farmer.

Prejudice and conceit are the offsprings of ignorance, and the great barrier to agricultural improvement. An African prince threatened to take the life of a traveller, because he dared to assure him, that water became solid by freezing, in his country. Because he had not seen it, the prince deemed the traveller an impostor and a liar. A few years ago, the growth of a hundred bushels of corn on an acre was considered a fabulous tale by the mass of the farmers. They had not seen such a product, and they therefore did not believe in it. But such a product is now of so common occurrence, that few doubts its reality. Tell these men that they can double the products of their farms, by economizing and judiciously applying their manure;—that they can quadruple it, by this, by underdraining, by alternating crops, and by root culture—and they are as incredulous as the African prince, because they are ignorant of those natural laws which ever have governed the material world, and which ever will govern it. The savage laughs at and rejects the art of civilized life, for the same reason that the ignorant or indolent farmer scouts the idea of improving the condition of society by agricultural societies, agricultural schools and legislative bounties for agricultural improvement.—They either do not know enough of natural science, to comprehend its utility in the ordinary business of life, or they are governed by a sordid, selfish, illiberal policy, which, could it be carried out, would shut out every ray of light, and smother every sentiment of patriotism, which should either thwart their views, or which would tend to elevate their fellows above their own limited standard in society. Some men seem to have an idea, that they are balanced in a scale; that as others can be made to sink, in the same proportion they shall rise, and vice versa. The first requisite to improvement, in any business, is the conviction, that we *can* learn; the next, that we *will* learn. And it perhaps is invariably true, that the more we *do* learn in useful knowledge, the more we become sensible of our comparative ignorance, and the more we are anxious to learn. This results not only from a wish to serve ourselves, and multiply our enjoyments, but from a sense of sacred duty to society.

Our national motto once was, "*millions for defence, but not a cent for tribute.*" A correspondent suggests the following parody, as suited to the action of the legislature upon the surplus fund:—"*Millions for the professions, but not a cent for the arts of productive labor.*"

If it is true, as is alleged, that some farmers in our legislature, are averse to giving any public monies to aid agricultural improvement, we do not hesitate to say the sentiment is unworthy of them; and that enlightened men will be apt to charge them with either ignorance or jealousy—ignorance of the value of rural improvement, and of their duty—or jealousy lest others may be enabled to surpass them—and their own profits and popularity be consequently lessened.

THE CONTRAST.—Massachusetts gives nothing from her public treasury to sustain her common schools, but she gives bountifully from her public treasury to sustain and encourage her agricultural socities, and is now about making an *agricultural* survey of her territory. Her schools are surpassed by none in the Union. New-York has given millions to her colleges, and millions to her common schools; but she clenches her purse with a convulsive gripe when she is asked to aid and encourage agricultural societies. If it is true, that wisdom lies between two extremes, those States might learn from each other.

FARMING IMPLEMENTS.—The State Agricultural Society have appointed a board of examiners, comprising men of science, and practical machinists and farmers, to meet semi-annually, to examine and thoroughly to test (and to give certificates of merit,) all farm implements and machinery which may be offered for their inspection. We are glad to learn, that the gentlemen designated will attend to the duties of their appointment, and that notice will shortly be given of the time and place of their first meeting. This measure, if properly carried out, and we feel confident that it will be, cannot fail of producing a highly salutary influence upon our agriculture, and upon the general interest of the State. It will give general confidence in implements and machines which are truly meritorious, and to multiply them upon our farms; while on the other hand, it will tend to prevent imposture, and to save great expenditures for inventions which are comparatively worthless.

BROOKS' SILK SPINNER AND TWISTER, deserves a further notice from our hands, because we think it ranks among the most useful improvements of the day, and is calculated greatly to facilitate our progress in the silk business. Let it be remembered, that very little instruction is required to qualify a woman to use it; that it is equally adapted to the fabrication of sewing silk, twist, or to a thread for any required fabric, and that it produces all these, as far as we can judge, in a perfect manner. Now the question is, what will it earn, in a silk family, or a silk neighborhood? For now-a-days, *profit* is the great desideratum. In this matter, we shall speak on the authority of the patentee, a very unassuming, intelligent, and, we believe, honest member of the society of Friends, or Quakers. He says it is a moderate day's work to spin and twist half a bushel of cocoons into sewing silk, and that the fair average product of these cocoons would be 175 skeins of sewing silk, worth now, at wholesale price five cents the skein. The highest price of cocoons is $4 per bushel. Assuming these data, and basing our calculation upon five bushels of cocoons, which a family of girls may easily produce every year, let us see what would be the gain which would accrue to this family in five years, from the are of this machine.

The 25 bushels of cocoons would produce 8,750 skeins silk, worth five cents at wholesale,		$437 50
From which deduct the wages of a woman, 50 days, at 50 cents,	$25 00	
Add cost of machine,	35 00	
And it makes a total of		60 00
And leaves a profit of		$377 50
The highest price at which cocoons sell is $4 which would be for the 25 bushels,		100 00
		$277 50

Which shows a profit, in buying and using this machine, over selling the cocoons, in the small quantity of 25 bushels, of $277 50. This would require the labor of a women only ten days in a year, or fifty days in the five years. The remainder of the time, to any extent required, might be as profitably applied, in working up the cocoons of the neighborhood, of the town, or of the county; and the value of the machine would be yet but little impaired by these earnings! Every silk district should have one of Brooks' machines.

IMPORTANT REQUISITES IN A WIFE.

A knowledge of demestic duties is beyond all price to a woman. Every one of our sex ought to know how to sew, and knit, and mend, and cook, and superintend a household. In every situation of life, high or low, this sort of knowledge is of great advantage. There is no necessity that the gaining of such information should interfere with intellectual acquirement, or even elegant accomplishment. A well regulated mind can find time to attend to all. When a girl is nine or ten years old, she should be accustomed to take some regular share in household duties, and to feel responsible for the manner in which her part is performed; such as her own mending, washing the cups and putting them in place, cleaning silver, or dusting and arranging the parlor. This should not be done occasionally, and neglected when ever she finds it convenient—she should consider it her department.—When older than twelve, girls should begin to take turns in superintending the household—making puddings, pies, cakes, &c. To learn effectually—they should actually do these things themselves, and stand by, and see others do them.—[Mrs. Child.]

A HEALTHFUL RECREATION.

Among the pleasant employments which seem peculiarly congenial to our sex, the culture of flowers stands conspicuous. The general superintendence of a garden has been repeatedly found favorable to health, by leading to frequent exercise in the open air, and that communing with nature which is equally refreshing to the heart. It was laboring with her own hands in her garden, that the mother of Washington was found by the youthful Marquis La Fayette, when he sought her blessing as he was abont to commit himself to the ocean, and return to his native clime. The tending of flowers has ever appeared to me a fitting care for the young and beautiful. They then dwell as it were, among their own emblems, and many a voice of wisdom breathes on the ear from those brief blossoms, to which they apportion the dew and the sun-beam.—[Mrs. Sigourney.]

MORUS MULTICAULIS NOT PRODUCED FROM ITS OWN SEEDS.

The following statement agrees with what we were first to inform our country men of, in this journal, more than two years ago, on the authority of an experiment reported in the *Annales de l'Agriculture Francaise*, that the *morus multicaulis* had been found to be merely a variety of white mulberry, and did not reproduce its own kind by seeds. This very important fact (if true) we have again and again endeavored to impress on the agricultural public—but apparently to no purpose. The anxiety to obtain seeds of the *morus multicaulis* has been so great, that encouragement has been so great, that encouragement has been thereby afforded to extensive frauds, by the seller substituting seeds of another kind. But even if the seeds had been what they were supposed to be, if from trees of the true *multicaulis*, the failure and disappointment would probably have been as great.

But though believing that the seeds of this plant are not to be relied on for reproducing their own kind, we are not inclined in any case to trust to reported opinions, or authority that is the least doubtful, when the facts can be tested by accurate experiment. We have the means of making such an experiment, in seeds of the *morus multicaulis* taken last summer from trees which grew within the enclosure of the high walls which surround the Penitentiary of Virginia, and near which no other kind of mulberry grew, to affect the seeds by a mixture of the fecundating farina. If *these seeds* will not produce the *morus multicaulis*, it may be thereafter safely pronounced, that seeds are not only not to be relied on to produce this kind, but that the result of reproduction of the like kind rarely, if ever, occurs.

"This mulberry, it is now well ascertained, is a hybrid variety, and not a true species—the seed will not produce its like. We have been informed by a gentleman who purchased a plant, three or four years since, of some nurserymen of our vicinity, that with considerable care he raised quite a number of seeds. The plant was taken up upon the appearance of severe weather, and placed in a cellar where the frost did not penetrate—the roots were slightly covered with earth. Pursuing this course two succeeding winters, it attained the size of a large shrub with numerous ramifying branches—the third season it produced seeds. No other species or variety grew in the vicinity of the plant, and the blossoms consequently could not have been fertilized but by its own pollen. These seeds were carefully sown, and the result was a number of seedling plants, with foliage of all sizes and textures from the common white, to that of the parent. No better proof is needed to confirm what we now state, and have heretofore stated."

ON CEMENTS.

A patent was granted to John Henry Cassell, of Mill-wall, for his invention of a cement or combination of materials applicable to purposes for which cement, stone, brick, or other similar substances, may or can be used.—[Sealed April 19, 1834.]

This invention consists in cementing or combining the materials for making roads, and for constructing docks, water-courses, foundations, and other similar works, by the aid of coal or other mineral tar, wood tar, and resinous matters, or the products of tar, in the manner hereafter described; and thus producing a mass, which may be formed or moulded into any figure, which, when cold, will be exceedingly hard, and be servicea

ble for the purpose of cement, stone, or brick, in constructing any such like works or buildings, as before mentioned. But in order that this invention may be perfectly understood and carried into effect, it may be necessary to describe the methods used by the Patentee for combining such materials together, and applying them to the aforesaid purposes. A quantity of tar, such as is produced by the distillation of coal, shale, or wood, is first taken, and by further distillation the aqueous parts are separated therefrom, and thus the tar or resinous substance is reduced to the consistency of treacle; this is called the first product, the tar or resinous substance being in a thick and adhesive condition when cold. In order to produce the second product, the distillation is carried on still farther, and by this means the essential oil is obtained; and for the third product, the process of distillation is carried on, till the substance becomes so adhesive, that a small portion being removed from the still may be drawn out into threads, and when cold, becomes brittle; and for the fourth product, the distillation is carried on still farther, till the substance becomes extremely hard, and will not soften by heat, either of the sun, or any artificial heat. The apparatus or still which is used for this purpose, is similar to that which is called a pitch still, which is well known, and forms no part of this invention, nor does the process of distillation for separating the tar into three products; that is to say, first, tar deprived of the aqueous parts, and reduced to a thick adhesive condition when cold. Secondly, the essential oil. Thirdly, the adhesive tar, or product thereof, which when cold, is hard; and fourthly, the substance not acted on by the heat of the sun. It may be desirable here to remark, that coal tar is preferred, in consequence of cheapness.

The Patentee then proceeds to describe the combining of these products with other materials, in forming a cement or combination in the making of roads, docks, water-courses, and such like works. We will first describe the method pursued in applying this invention to the making of roads, or in repairing them. Having laid out the road, and made the necessary drains for preventing the lodgment of water below the road, the surface is prepared by beating or rolling, in order to compress the earth, particularly when the surface is composed of loose earth, and, by raking, bring the surface to the required figure, that is, with such slopes as may have been determined upon, and make the same as even as possible. The surface is then saturated with the essential oil, (the second product,) in thin layers, allowing time for it to subside. The oil put on in this manner will quickly penetrate the ground: the second operation is then commenced, which consists of spreading over the surface of the earth so prepared a thin coating of the first product, perhaps one-fourth of an inch thick, then let the same be ignited, and permit it to burn a short time. Dry sand, or fine dry earth, or slag, or cinder, or a combination of these, should then be sifted on the tar and oil, to the depth of about half an inch, which will instantly put out the flame. The ground should then be rolled, in order to cement the tar and sand together; and, in order to facilitate the operation, it is found desirable to have a frame of iron, or other material, about three feet square, which is successively placed over the surface of the ground, and thus complete portions of the surface at each operation. By this means, it will be evident that a thin cemented layer or surface will be produced on the road. In some instances, one, two, or more layers of this description may be made on the road, depending on the extent of trafic to which it is to be subjected; but it will be desirable to remark, that the essential oil is only used previous to the first layer. Having thus prepared the under surface of the road, the Patentee proceeds to describe in what manner the same is finished; and observes, that the finishing materially depends on the description of materials, which may be readily obtained at the place where the road or other work is being constructed, such as broken granite, flint, slag, gravel, or any other hard material suitable for the surface of a road. It shou'd be observed that the same should be broken somewhat small, say not larger than three inches, and one-third of the third product should be taken to two thirds of sand, and boil and mix them together; then pour such mixture over the broken materials to the desired depth, which running into the space between the stones, forms a very hard and solid mass when it cools. When the said fourth product is in a melted state, any of the materials, such as sand, stone. &c., may be mixed in an open vessel, in the proportion of one-third of the fourth product to three of stone, sand, &c., by weight, and mix them well together; and when so mixed, the composition is spread over the surface of the road from one to four inches deep, or more if it is thought necessary, the road being prepared as before described; this is then rolled so that as even a surface as possible will be produced; by which means a hard surface will be formed, which will wear exceedingly well, and produce a cheap and lasting road. Or where it is desired that the upper surface should be formed of larger stones, or other material, such as broken granite, flint, slag, or other substances, of a size such as is generally used in making what are called Macadamized roads, frames or moulds may be used from twelve to forty-eight inches square, open at top and bottom, like a brick mould; pack in them a number of such broken pieces of material, and then run in a quantity of the fourth product in a melted state, and then fill up the interstices between the stones or other materials, making the upper surface as even as possible. These materials, when left in the moulds till they are cold, will be stronly cemented together, and be ready to form the upper surface of the road, they should be put on in the following manner: having prepared the road, as above described by the essential oil, with the first product, and the sand or fine earth, a coat of the third product of the tar should be spread over to about the thickness of one inch; then, while the third product is warm, cover the road with the moulded materials, placing that part which was uppermost in the act of moulding, on the surface of the road prepared as above, and by rolling or pressing, cause the moulded parts to adhere firmly together, by this means, rather a rough surface will be produced, suitable to the tread of a horse. The first preparation is also used to cover good Macademized or other roads, which firmly cements every stone into its place, prevents the wheels from ploughing up the roads, the water from softening the substrata, and preventing mud and dust from rising. The third product is also used, when in a melted state, to pour between the joints of street pavement, in the manner that grouting is now performed: this will cement every stone together, and so prevent water from getting beneath the stones to the sub-soil, or rising therefrom. If the sub-stratum is of a soft substance, or the street is required to be very durable, the ground is first prepared, as described in the first process: the paving stones are then saturated with essential oil, and the third product is then run between the joints of the stones or bricks that are required for foundations. The resin of wood is used for making stone and cast figures, that are required to be of a yellow color; sand of the required color is added, as in the fourth process. In some instances, instead of moulding such larger pieces of flint stone, or other material, sand, or fine earth, is mixed with the fourth product when in a hot and melted state, and the composition is moulded, as above described: such materials being very suitable for foot paths, water-cisterns, pipes, and a variety of other useful purposes.

Having thus described the nature of the invention, as applied to roads, the Patentee proceeds to describe its application to canals, docks, water-courses, and such like works. The earth being excavated, and the slopes of the banks made to the intended figure, the next process is to beat the surface of the earth; and in order to render the same as compact as possible, it is saturated with the essential oil, as before described; then a thin layer of the first product of the tar is run over and ignited; after that, sand, or any other dry earth or material, is sifted over, as above described. Three layers of these cemented materials will be sufficient when applied to the usual slopes for canals and water-courses, and will offer a compact and close surface to the water; which will protect the banks from the prejudicial washing to which they are otherwise subject, and consequently be of great utility when quick travelling is required, or when the canal boats are propelled by machinery. In forming the embankments of docks or quays requiring steep or perpendicular walls, a much stronger facing is required, depending on the depth of the water they are to support, and also the description of ground behind.

The Patentee proceeds to state that a framing of wood is usually constructed to the desired thickness; and having previously made a good base or foundation of a combination of the fourth product of the tar, with broken stones, or other rough hard materials, and sand or earth, he continues melting and mixing quantities of the fourth product of tar with broken stones and sand, in the proportion of about one of the fourth product to three of the stones and sand, or other material, and successively throws them into the frame, and levels and beats such concrete mixture, till the frame is quite full to the sur-

face of the intended finish of the wall, which is usually made to lay on the surface of the earth. It would be advisable to remark, that between each quantity of the material thus put into the frame, it is found desirable to spread over a thin coat of the first product of the tar, and ignite the same, in order that the surface of the last quantity should be in a melted state, to receive the next quantity of the material. It will be evident, from the above description, that piles, and also landties, may be built in the walls, in order to give additional strength to them; and that where frames or moulds are used, they are washed over with a covering of white-wash or of clay, by which means the composition does not adhere to them.

The Patentee concludes by saying, that having thus described the nature of his invention, and the manner in which the same is performed, he would have it understood that he does not claim any of the materials separately; and it will be evident that the means of carrying the same into effect, may be varied to suit the particular object to which the invention is to be applied: but he would have it understood, that what he claims as his invention, is the cementing or combining the materials for making and mending roads, and for constructing docks, water-courses, water-tanks, pipes, and such like work, by the aid of tar and resinous substances, or the products thereof, as above described.—[Lond. Jour. Arts and Sciences.]

From the London Mechanics' Magazine.

ON A PECULIAR VOLTAIC CONDITION OF IRON, FIRST NOTICED BY PROFESSOR SCHOENBEIN, OF BALE.

Sir,—The facts contained in the present communication, are not to be understood as laying claim to originality in their leading principles; some of the experiments, however, that I shall have occasion to describe, have never been made, or at any rate, I have never seen any account of them by any one else, and the whole are so extraordinary, and will, in my opinion, eventually throw such light on the rationale of Voltaic action, that I think you will not object to give them publicity through the medium of your Journal. In the *London and Edinburgh Philosophical Magazine*, vols. ix. and x., may be found the original papers of Professor Schoenbein and Dr. Faraday. All the experiments there described, I have attentively gone through, and I shall merely give here such an abstract of them as may be necessary to set the matter clearly before your readers.

Ex. 1.—When iron wire, $\frac{1}{8}$th of an inch in diameter, was immersed in nitric acid, specific gravity 1.379, it was attacked with violence; but when surrounded, or even touched in the acid by a piece of platina wire, action was instantly stopped. The platina was then removed, and the wire remained for any length of time in the acid without any action, and as bright as silver. If it was now taken out, wiped, and again immersed, violent action immediately took place for a moment, but it soon (generally) was again quiescent.

Ex. 2.—If, when the wire was in violent action, it was touched by a piece of platina, the effervescence instantly ceased, but again commenced when the platina was removed. Bringing the two metals a second time into contact effectually stopped the action. If the wire was in a very violent state of effervescence, it was not for some time protected by the platina.

Ex. 3.—If a wire made thus inactive by platina, was touched in the acid by a piece of zinc, or a common iron wire, it was thrown into action: but an iron wire having the smallest piece of platina attached to it, did not throw it into action, being itself inactive. If the platina was now slipped off, and either wire touched once with a common wire, both were instantly thrown into violent action.

Ex. 4.—When the acid was disturbed with an equal bulk of water, platina did not preserve iron wire from its action, even when coiled thickly round it; it appeared, indeed, rather to quicken the action. But though it did not preserve it under these circumstances, it did under others which I shall notice presently.

Ex. 5.—Half a wire, four inches long, was heated to dull redness, the blue tinge extended through three inches when the wire was cold, and these three inches were quite inactive in acid specific gravity 1·379, the other inch was active; when the heated end was made bright by filing, it was rendered active, showing the former inactivity to be owing to the superficial coating of oxide.

Ex. 6.—When a wire made indifferent to nitric acid by platina was immersed in the acid, and another common wire dipped into the same vessel, the latter was of course active; but when the wires were made to touch at their parts *above* the liquid, action was excited in the indifferent wire.

Ex. 7.—A common wire was made to touch an indifferent one, and both dipped into the acid, the *indifferent* one going in *first*. By this means, the common wire was made indifferent, not being in the slightest degree acted on by the acid; the second wire rendered indifferent a third, the third a fourth, and so on. This experiment succeeds best with wire that has been made indifferent by platina, but with care it will answer equally well with wire that has been made indifferent in the fire; the conditions appearing to be perfect contact, and gradual immersion. When these wires were taken out of the acid and wiped, they always returned to the active state, but were again made indifferent by repeating the process.

Ex. 8.—A wire, polished very bright, was protected by platina, and immersed in a solution of nitrate of copper, and nitric acid, which acted very strongly on common iron, copper being deposited on the metal: the protected wire *remained, however, bright*. After remaining a few seconds the platina was removed, the iron instantly became as common iron, but when the platina was allowed to remain in contact an hour or two, and then removed, the wire was left in the peculiar state, exhibiting the curious phenomena of a piece of polished iron being quite inactive in a solution of nitrate of copper and nitric acid. The wire thus inactive, on being touched by a piece of common wire was instantaneously rendered active, undergoing rapid solution, and becoming covered with a crust of copper.

Ex. 9.—A piece of iron was protected by a piece of platina, and immersed in nitric acid; the platina was then withdrawn, the iron remaining in the peculiar state. A piece of common iron was then bent into a fork, and slipped down the inactive wire into the acid, by which it was itself rendered inactive. Now if another piece of iron was made to touch the fork *before* being introduced into the acid, it was rendered itself inactive; but if it was first thrown into action, and then made to touch either end of the fork, it threw all the wires into action. This is rather different from the result obtained by Professor Schoenbein. He describes that end of the fork that was touched, being *alone* thrown into action, the other remaining in the peculiar state as long as the first wire was kept in contact with the bend, but when that was removed both ends became active. The Professor's experiment was made with an oxydised wire. I found it difficult to reduce the fork to the peculiar state with such a wire, but when I accomplished it the phenomena were similar to those just described. I should much wish this experiment to be tried by others, as I am at a loss to understand whence this disaccordance should arise.

Ex. 10.—When an active wire was connected with one of the cups of a galvanometer, and a platina wire with the other cup, and both wires dipped into nitric acid, momentary action took place, and an electrical current was shown to pass from the iron to the platina through the fluid, the latter metal becoming positive, but the action soon ceased, the platina protecting the iron, though not in actual contact with it; when chemical action was stopped, the electrical current was stopped also.

Ex. 11.—When the iron wire was connected *first* with the galvanometer, and the circuit completed by putting it into the acid, the platina wire having been previously arranged, no action, either chemical or electrical, took place. The same was the case if a wire, having been previously made inactive, was substituted for the platina. Now when platina was used, the moment the circuit was closed, bubbles of gas made their appearance on the platina, and if an iron wire was used, having a small piece of platina foil or wire attached to it, the bubbles formed on all parts of the foil, but none made their appearance on the iron. If then the platina foil was removed, the bubbles made their appearance on the iron, which sometimes also went slightly into action.

Ex. 12.—When two cups were employed, being connected by a compound platina and iron wire, all the phenomena which took place in a single glass were observed, and the platina or inactive iron in one glass, exerted a protecting influence on the iron in the other, provided the communication was first made through the galvanometer; a touch from a common wire also threw the iron into action, producing a strong electrical current. The same was the case with three or four glasses connected by a compound wire.

Ex. 13.—When the acid was diluted, so

as to have a specific gravity 1·204, platina, as was before observed, could not protect iron from its action; neither when connected with the galvanometer did it, if the iron was dipped in the acid first; but if it was first connected with the galvanometer, and then put into the acid, no action whatever took place in any length of time; on removing the platina, action sometimes took place; it always commenced when the inactive wire was once touched in the acid with an active wire, or with a piece of copper. The wire, thus made inactive, did not possess the power of rendering other wire inactive, but was always thrown into action itself. When a piece of common iron was substituted for the platina, whether it was connected with the galvanometer first or not, the wire in this case acted as platina to the second.

Ex. 14.—When two cups were employed, and connected by a bent piece of wire, and so arranged that the iron wire should be active, on removing the connecting wire, and taking a fresh piece, if it was dipped first into the cup containing the iron, and the other end brought into the platina cup, *that end was in the peculiar state*, and there was no passage for the electrical current, the needle of the galvanometer being quiescent; but when it was put into an active state the electrical current passed. Now here we have the iron made inactive *without any metallic communication with the platina*, and when inactive it is found incapable of conveying a current of Voltaic electricity; an inactive wire could not, in this experiment, be substituted for the platina. This latter most remarkable, and, as I believe, at present, inexplicable fact, has, as far as I know, never before been noticed, but that it is true, any one may in a few minutes convince himself. I have often left the whole arrangement undisturbed for hours, and still, at the end of that time, the end of the connecting wire in the platina cup has been *perfectly bright*, and the needle of the galvanometer stationary in its usual position; but on touching it once with a common wire, it has been thrown instantaneously into action, and then the electrical current has passed, the needle being strongly deflected. I am, at present, occupied in further researches, and I hope something satisfactory in explanation of this dark subject will soon transpire.

I am, Sir,
Your obedient servant,

Near Bath, March 15, 1837.

From the London Mechanics' Magazine.

MR. SIEVIER'S PATENT CAOUTCHOUC CORDAGE.

Sir,—In consequence of a letter which appeared in your valuable journal respecting Mr. Sievier's "patent rope," and the strictures thereon by your correspondent Many-points, I was induced to procure a piece of the said rope from the Company's establishment at Tottenham, prepared and manufactured according to the directions given in the specification by the patentee; it measured 4 feet 6 inches long, and was ⅜ths of an inch in diameter, composed of 12 strands, each strand had a slip of India-rubber in its centre. This was placed in the garden in a northerly aspect, and allowed to remain exposed for two nights and days to a frosty atmosphere, uncovered, the thermometer being at the time at 29°. When removed early on the third morning from its Siberian situation, it was found to be pliable and elastic, and its length was the same.

A similar piece was immersed in a butt of cold water, and allowed to remain for ten days; at the expiration of the above time it was removed, and its elasticity, pliability, strength, and length, were found to be the same as when first put into the water. Caoutchouc, or India-rubber, by itself becomes very hard when exposed to the atmospheric air, or when immersed in cold water for any time; but this change does not take place when it is interlaced or combined in any way with good hempen thread—the rigidity is prevented, its elasticity is preserved, and its pliability remains. Perhaps Many points was not aware of this fact.

Hoping the above brief statement of facts will satisfy Many-points, as well as your numerous readers,

I am, Mr. Editor,
Yours respectfully,
NAUTICUS.

March 28, 1837.

From the London Mechanics' Magazine.

PRACTICAL REMARKS ON KEEPING BEES.

Sir,—Having been requested by some person desirous of keeping bees, to give, through the medium of the *Mechanics' Magazine*, my opinion as to the best method of managing these useful insects, I beg to solicit the favor of the following observations being inserted.

I have kept bees nearly twenty years, and practised various plans with a view to gain the greatest produce in honey and wax with the least trouble, but more particularly with a view to the preserving the lives of the bees, and feel confident that the story-fving system, which I believe Wildman practised, is the best. I tried for six or eight years the plan Mr. Nutt advocated, which, by-the-bye, is as old as any of the plans known, but without meeting with any thing like the success of the common cottage hive. A strong stock in the latter had produced me an early swarm and cast, the swarm producing in a good season upwards of forty pounds of honey, and the cast fifteen pounds, the stock being kept five or six years. The honey thus procured is always of good color, and fit for sale; and when after six seasons the parent stock is destroyed, the honey, being dark, may be used to make meed, or sweeten wine with, a strong swarm being kept to supply its place. This plan requires the destruction of the bees, and is therefore censured as inhuman; but to me is not more so than destroying beavers and cats for their skins, or catching fish to manure the land with; the consumer never considering how produce is procured, and should, therefore be considered the most culpable, if such acts are breaches of humanity. The hives I now prefer are flat, having wooden tops fixed on with wires. The inside should be twelve or thirteen inches clear, and about seven inches high, the top having a centre hole, and three or four others round it near the outside, each hole being two or three inches diameter, and fitted with nice bungs. If no swarms are wanted, a large glass, or small straw hive, may be put on the top about the end of March, or a small glass to each hole, previously pulling out the bungs, gently turning them round first, each glass having a bit of paper pasted on it, stating its weight when empty; such glasses being kept from the light, by an empty hive being placed over them. Every ten or twelve days they should be examined, and when filled may be removed, and others put on, as long as the season permits. If a stock is weak, a new swarm or a cast may be put on the top of it, and the entrance closed till eight or nine o'clock the following night. These stocks may be preserved seven or eight years, but should be kept in a house or shed; and when the winter begins, the bungs having been replaced, should be covered over with sacking or other warm articles. Glasses may be put on a swarm immediately after hiving them, removing them in three or four weeks, to enable the bees to procure enough for the winter. The boards above mentioned should be made of pine plank, half an inch thick. The bottom boards should be made of the same, one inch or one inch and a half thick, having a piece projecting for the bees to light upon. By pursuing this plan, any number of stocks may be kept with but little trouble, and the bees saved; but the placing the glasses on empty hive early, is essentially necessary.

I am, Sir,
Your obedient servant,
G. L. SMARTT.

Enfield, Feb. 10, 1837.

From the Baltimore Farmer and Gardener.

A NEW MOTIVE POWER.

BALTIMORE, April 8, 1837.

MR. ROBERTS—When I stated to you the fact of an intimate acquaintance of mine having constructed a machine of almost unlimited propelling power on the Hydrostatic principle, you were so much pleased with the account as to request a communication from me for insertion in your periodical; with that request I cheerfully comply.

The inventor of this wonderful and useful machine is Mr. Theophilus Corbyne, an eminent vetinarian—a native of Scotland, and now residing in Pittsburg, Pa. who while practising his profession, has for the last seven years employed his leisure hours on this subject and has now the satisfaction of seeing his plan matured by having constructed one of twelve horse power, which comes fully up to his most sanguine expectations.

This machine he calls CORBYNE'S HYDROSTATIC PROPELLING MACHINE. In its construction it is too simple to admit of improvement, and as no steam nor heat of any kind is used in its operation, there can be no explosion, therefore in its use life is safe; and should any part break, it is by its simple construction, admirable of speedy repair.

It is applicable to the plough,* and all propelling purposes, and as such it must supersede the use of steam.

A machine of 500 horse power can be worked by one man and neither its weight or the room required, will be more than one-tenth of the steam engine.

We of the present age, entered on a new era when Fulton brought forth his extended scheme in the application of steam to the propelling of boats on water—in which smoke and vapor supplied the place of canvass. The same age is now bringing forth another era in a more useful and extended scale of operation in this discovery of my friend, who is a philosopher and philanthropist in every sense of those terms.

Although our profession has for several years made us intimately acquainted, visiting each other, and conversing freely, for mutual benefit in our profession—yet true philosopher like, he never intimated to me that he was studying the subject, until on his way to Washington, he called on me and showed the model, which is now in the Patent Office.

With my respects, I am, yours, truly,
JOHN HASLAM.

* The inventor is fully under the impression that a plough constructed on the principles of his machine, will be competent to plough 100 acres of ground a day.

Items.

EGYPTIAN ANTIQUITIES.—At the close of a series of lectures on Egyptian Antiquities, lately delivered at Exeter Hall, by Mr. Pettigrew, that gentleman unrolled a mummy, which had been presented for the occasion by Mr. Jones, of the Admiralty. This operation excited a marked feeling throughout the whole of the numerous auditory, including many individuals of distinction in the literary circles. In the commencement, Mr. Pettigrew noticed that the inscription on the outer case differed from that on the inner case containing the mummy. Both stated the party to have been a female; but the names and genealogies were different, and the latter stated the mother of the deceased to be living when her daughter died. It might be that the wrappings would settle the point; which, however, they did not, for no name was found on them, as often occurs. The mummy was Greco-Egyptian, and embalmed after the ancient manner—the bowels being extracted by an incision on the left flank, and the brains, probably, through the nostrils as the nose was much broken. The legs were separately bandaged, and the ankles bound by stripes of painted linen, about half an inch in breadth. The figures were not hieroglyphic, but simply ornamental.—Bands of the same kind surrounded the arms, which were crossed upon the breast; and a similar circle went round the neck. On each knee was a thin piece of gold, resembling the lotus flower; over each eye the providential eye of Osiris, of the same material; and another golden ornament upon the top of the ridge of the nose. There were rings on the fingers; but the opportunity was not sufficient for examining them, nor time for proceeding to the careful and laborious unrolling of the body to the end. The upper wrappers were not voluminous, and of coarse nankeen-colored linen. Then came a complete envelope of asphaltus, and below that, the usual disposition and extent of liner rolls. On the soles of the feet were sligh sandals, transversely striped black, white, and red, exactly like those painted on the bottom of the inner case. The finger and toe nails were gilt; and, altogether, the subject presented many objects for further investigation and study.

[Literary Gazette.]

FUEL.—A cord of dry wood of any kind, contains the same quantity of carbonaceous or combustible matter, as a cord of green wood; and in the combustion of the green wood, a large proportion of the heat produced, is employed to convert the sap into vapor, where it becomes latent, and is lost.

Dry hickory is cheaper at four dollars a load, than dry white wood at two dollars. The following table shows the comparative value of different kinds of fire-wood, as ascertained by the experiments of Mr. Bull of Philadelphia. It should be remarked, however, that the Oak of Pennsylvania is more compact, and makes better fuel than the Oak of Michigan, at least this part of Michigan. Our maple too, is a heavier wood, and makes better fuel than the white ash.

	Pounds per cord.	Per cent of comparative value.
Hickory	4460	100
Pignut	4241	95
Chesnut Oak	3955	85
White Oak	3821	81
Red Oak	3254	69
Yellow Oak	2919	60
White Ash	3450	77
Black Birch	3115	63
White Birch	2369	48
Rock Maple	2878	60
White Maple	2668	54
Yellow Pine	2463	53
Pitch Pine	1904	84
White Pine	1862	34

[Michigan paper.]

CULTIVATION OF FILBERTS.—Sir, in consideration of the periodical return of the season for trying the merits of the suggestion I inserted in your number 183, just 10 years ago, for improving the crop of filberts, and as I have reason to believe from my own and other's subsequent experience, that my idea is well founded, you will perhaps allow the re-appearance of the following:—"In countries where figs are cultivated to the greatest perfection, particularly in Italy and Greece, a great augmentation, both in the size and number of the figs, is obtained by placing on the top of the tree a branch of the wild fig-tree (*Caprificus*), upon which have appeared male-flowered figs, which are the first to come forth. I have often thought, that the crop of filberts might be both ameliorated and increased, by a somewhat analogous application of a branch of the common hazle, when covered with the 'cat-kins' or flowers. This is just the time to try the experiment." I hope that some of your correspondents who have the opportunity, will try and report upon the experiment. Besides the increase of the pollen, it may have an effect like the recurring to the original stock by grafting or seed, as with apples and some other fruit-trees. Filbert-trees are often deficient in male flowers.—Yours, &c., F. MACERONI.

NEW LAMP.—A lamp of a new construction, which describes a circle of light of about thirty feet in diameter, of the apparent intensity of sunshine, showing the objects within its sphere as distinctly as on the table of a camera obscura, has been erected at the head of the inclined plane in St. Leonard's depot. Its object is to enable the engine-man to a distinct view of the inclined ropes during the night, and this has been fully attained. The lamp consists of an Argand burner, placed in the focus of a large speculum, of a peculiar form, by which the whole light is distributed just on the space where it is required. It is computed that the light on the above space is equal to that of twenty-five or thirty similar burners in common lamps. A lamp of this kind we have no doubt would be useful for other purposes. It appears to us that the largest assembly-rooms might be brilliantly lighted by one placed at each end of the room, and one would be sufficient to light the stage of a theatre. The cost of this one is said to be about £200 but we understand it saves an annual expense of about half that sum. The inventor is a Mr. Rankin, and he names it the conoidal lamp, probably because the light is thrown from it in the form of a cone.—[Caledonian Mercury.]

THE IMPORTANCE OF TIME KEEPING.—The topography of watch-making, at home and abroad, would present a vast number of curions and interesting facts.—In consequence of the minute subdivision of labor in this trade, it is said that there are only three places in the United Kingdom where a complete watch can be manufactured,—London, Liverpool and Coventry. The business has been introduced at the latter place entirely since the year 1800, and the number of persons employed in it there, is now supposed to equal the number in the metropolis.

EXTRAORDINARY DRAUGHT BY ONE HORSE.

The following extraordinary feat of a draft horse has been recorded. Soon after the completion of the Surrey Iron Railway, and when it was open for the conveyance of goods from Wandsworth to Mertsham, a bet was made, that a common horse could draw thirty-six tons for six miles along this road, and that he should commence his labor with a dead pull, as well as turn it round the occasional windings of the road. A number of persons assembled near Mertsham to witness the performance. Twelve wagons loaded with stones, each wagon weighing three tons, were linked together, and a horse taken from a timber team of Mr. Harwood was hooked to the first wagon. He started from near the Fox public house, and drew this immense weight with apparent ease, to near the turnpike at Croydon, a distance of six miles, in one hour and forty-one minutes. In the course of his journey, he was stopped four times, in order to show that it was not by the acquired impetus that he performed the task. After each stoppage, a chain of four wa-

gons was added to the train, with which the same horse set off again without difficulty, even after about fifty men had mounted them.—[Far. Mag.]

ON THE PROCESS OF CARBONIZATION, OR MANUFACTURE OF CHARCOAL, AT GOERSDORF, IN SAXONY.

It having been suggested by M. Boult that a superior charcoal might be produced by filling the interstices of the pile with small charcoal, the refuse of former burnings, an experiment was made, which, after being several times repeated, gave the following results: 1st, an increase of produce, amounting to not less than four per cent. above that yielded by the ordinary process; 2nd, a much smaller quantity of dust and small coal, 3rd, scarcely any smoke; 4th, charcoal of a very equal and superior quality.

A pile prepared for carbonization at Goersdorf contained in general about thirty *schragen*, (318 cubic yards) of pine trees split in quarters, which yielded, including the small coal, from eighty-nine to ninty-two per cent. in bulk of charcoal. It was considered desirable to ascertain, whether by increasing the size of the pile, a more considerable product would be obtained.—A pile containing forty-nine schragen (520 cubic yards,) of cleft pine wood, gave in an experiment, during which the weather proved favorable, 89.94 per cent. of charcoal (including the small,) very sonorous, and of very good quality. A second trial of 69½ schragen (740 cubic yards,) of similar wood produced only 87.98 per cent. but the weather in this instance was unfavorable.

This experiment was repeated with seventy-one schragen (750 cubic yards,) the weather continuing fine throughout the process; the produce amounted to 94.87 per cent.; equal in quality to the former results. The average results of the adoption of this process at Goersdorf, will appear from the following table of the produce, from the commencement to the date of the latest improvements.

	Produce per cent.		Total produce per cent.
	Large.	Small.	
1821. . .	74.34	3.91	78.85
1822. . .	76 24	4.76	81.—
1823. . .	76.44	5.25	81.69
1824. . .	77.95	4.09	82 04
1825. . .	86.31	4.35	90.66
1826. . .	86.31	3·62	89.93
1827. . .	87.53	4.20	91.73

The increase observable in the produce of 1825, is to be attributed, principally to the care with which the operations were conducted, but it must be also remarked, that the removal of the pipe for collecting the acid formed in the process of carbonisation, may also have contributed beneficially to the results. M. Karsten in his *Voyage Metallurgique* states, that in Carinthia, the carbonization of pine wood is performed in large stacks, containing 20,000 cubic feet, and without the trees being previously split, yet the produce in bulk is computed at from seventy-one to eighty-six per cent. It is obvious, that there exists no analogy between these results and those obtained from the brushwood and billets of oak, beach, &c., by the common process of carbonization, which seldom yields more than from thirty-five to forty-five per cent.; it is, therefore, only necessary to call public attention to the fact, and it may naturally be expected that, in the present state of practical science, a subject of so much importance in metallurgy will be duly investigated.—[Lond. Quar. Mining Review.]

CONSUMPTION OF COAL IN GREAT BRITAIN.—The quantity of iron annually produced in Great Britain may be taken at 700,000 tons; and the quantity of coal required, at an average, to produce each ton of iron, including that used by engines, &c. may be estimated at 5½ tons; giving a total of 3,850,000 tons consumed in the making of iron. According to Mr. Kennedy, the quantity of coal consumed in the cotton manufacture, in 1817, was upwards of 500,000 tons, and the manufacture has since more than doubled; so that, allowing for greater economy, we may fairly estimate the consumption of coal in the cotton trade at 800,000 tons a year. Its consumption in the woollen, linen, and silk trades cannot be less than 500,000 tons. The smelting of the copper ores of Cornwall consume annually about 250,000 or 300,000 tons; and it is supposed that the brass and copper manufactures require nearly as much. If the salt-works of Cheshire, Worcestershire, &c. the consumption is probably not under, if it do not exceed, 300,000 tons. The consumption in lime works may, it is believed, be estimated at 500,000 tons. It would appear, therefore, that the total annual consumption of coal in Great Britain may be moderately estimated as follows:—

	Tons.
Domestic consumption, and smaller manufactures	15,000,000
Production of pig and bar iron	3,850,000
Cotton manufacture	800,000
Woollen, linen, silk, &c.	500,000
Copper smelting, brass manufactures, &c.	450,000
Salt-works	300,000
Lime-works	500,000
	21,350,000
Exports to Ireland	750,000
Ditto to colonies and foreign parts	600,000
Total	22.700,000

If we suppose that the above sum of 22,700,000 tons costs the consumer, on an average, 7*s.* a ton, it will be worth, in all, 7,955,000*l.* a year!—[M'Culloch's Account of the British Empire.]

IMPROVED RAILWAY.—We have seen models of improvements in the construction of Railroads, made by our townsman, Isaac Cooper. So far as we are capable of judging we give our most decided approbation of the Plan. The objects proposed to be accomplished by Mr. Cooper on his new plan, are cheapness of construction, security against lateral pressure, facility of repairing, and durability of this material, and we think those objects are all attained.

Mr. Cooper has applied for a patent and has now in preparation a full description of his improvements, which will be published in a few days. We refer to this and to his models, as the best means of acquiring a knowledge of the plan.—[Ebensburg Sky.]

MORE RAILROADS.—The Lockport Balance states that the Railroad between Lockport and Niagara Falls commences operation immediately—cars running twice a day each way. The Railroad between Niagara Falls and Buffalo, is put in good order for the season; and as there will be a Railroad from Lewiston to intersect the Lockport and Niagara Falls route, great facilities are offered for intercourse between several important points. In connexion with our Tonawanda Railroad, a track from Batavia to Buffalo or Lockport would give Rochester full enjoyment of the conveniences thereby afforded.—[Rochester Republican.]

ROCHESTER AND BATAVIA RAILROAD.—We are pleased to learn that this railroad is in a condition to permit Locomotives to pass upon it. The following letter published in the Courier, shows the importance of this road to the agricultural community, even by itself, but its present value is nothing compared with what it will be when continued westward to Buffalo, and eastward to Auburn, Syracuse and Utica, an event by no means distant.

BATAVIA, (Genesee Co.,)
May 5, 1837.

DEAR SIR,—The appearance here this morning of the first locomotive engine, with its train of cars, created quite an excitement among us, and for a while dispelled the gloom of "*hard times*," and re-animated the spirits of our citizens. The railroad, 34 miles in length, connects the flourishing city of Rochester with this village, and brings the two places within two hours ride of each other, at the same time opening a new avenue for the discharge of our surplus produce directly into the Erie canal. In an agricultural point of view, perhaps no portion of western New-York is richer in all the great elements of wealth, than the section immediately around us; and, aided by this road, we must contribute greatly to the advancement of the commercial interests of Rochester—to say nothing of the advantages to the country generally. As a point for the purchase of wheat, I think I hazard nothing in saying that no place affords greater advantages than this. It being the point where the Holland Land Company originally located their principal office, and where their business has always been done, the roads, which intersect the farming territory in every direction, have been made directly to this village, making it, necessarily, the natural place for a market. Suitable ware houses are now in progress of building, and we have nothing to ask but *easy times* for our

ney, and good crops, to keep half the flouring mills of the State in constant operation. The railroad itself passes through a very rich and interesting section, and is spoken of as among the most permanent and best constructed in the country,—offering to persons travelling in this quarter an agreeable change, either from the canal at Rochester, or from the usually travelled route by stage from Buffalo eastward. It cost for a single track, with suitable turnouts, three locomotive engines, passenger and freight cars, &c. &c., about $10,000 per mile, which has been furnished entirely by the individual means (with two or three exceptions) of persons resident in one or other of the two places it connects, and speaks well for their enterprising spirit. After this week the trips of the locomotives will be regular, and should any thing bring you this way, allow me to hope you will make it convenient to pass over the Rochester and Tonnewanda Railroad.

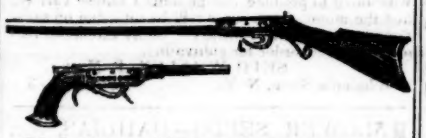
COCHRAN'S MANY-CHAMBERED GUN.

We always take pleasure in speaking of important inventions, even though they may not tend *directly* to the construction of Railroads or Canals—and therefore we give the following testimonials of the value of Mr. Cochran's improvement in *fire-arms*, with a drawing and concise description of the improvement.

The *chambers*, or receptacles for the charge, are in the periphery of a cylinder of about 4 inches in diameter, and ¾ths of an inch thick, which revolves horizontally on a pivot, bringing each chamber alternately in a line with the barrel; on the under side, and about equidistant from the periphery, and centre of the cylinder is placed a small cone to receive the percussion cap. There is a cone to each charge, having a communication with the powder. When the cylinder is charged,—each having *nine* charges,—the caps are put upon the cones, and then the cylinder is put in its place and secured there by a spring.—When in its place, each chamber, or charge, points in a different direction, and each cap is perfectly protected from explosion, except the one communicating with the chamber in line with the barrel, and after discharging which, no further explosion can take place without moving a spring, which permits the cylinder to make the *one-ninth* of a revolution, thereby bringing another chamber, or charge, in line with the barrel. A person familiar with the use of this gun, having *extra* cylinders in his belt, can easily make *thirty shots in a minute*; as he would only remove it from his face *three* times, to make 36 shots.

The great facility with which it can be discharged, is not, as will be perceived, on reading Capt. Gordon's Letter, its highest recommendation. The *certainty* of explosion, even after long exposure in damp weather, is of the first importance; a quality which it appears to possess in an eminent degree.

The accompanying drawings show the positions of the cylinder in which is represented the chambers and the cones for the caps.



If further evidence, than the annexed letters from gentlemen every way qualified to give a correct opinion, is required, it can be furnished, by actual demonstration, to those who will call on Mr. Cochran, or Messrs. Richards & Richardson, of this city, who are the Agents of the Company engaged in the manufacture of the article.

☞ A specimen of this beautiful article may be seen at this office—where orders will be received for *Rifles* or *Pistols*.

I have examined, and seen fired the ingenious invention of Mr. John Cochran's many-chambered gun, and, have no hesitation in saying, it combines simplicity, neatness, and at the same time, great despatch; and for all the uses of warfare, should approve of it highly.

ANDREW JACKSON.

Washington, Jan., 1837.

I cheerfully unite in the above testimonial, of Mr. J. W. Cochran's gun.

ANDREW JACKSON, JR.

—

WASHINGTON CITY, Jan., 1837.

We, the undersigned, have witnessed the experiments made by Mr. John Cochran, with his many-chambered gun, and are of opinion, that we have never seen any thing to compare with it; as to its simplicity, safety, and the rapidity and certainty of its firing; it can be fired thirty times in a minute, with great effect; it is in our opinion, one of the most formidable weapons ever invented.

D. S. CLINCH,
G. J. DRANE, U. S. Army,
WM. P. DUVAL,
WM. COST JOHNSON,
S. WARRINGTON,
SAM'L. C. REID,
CH. G. RIDGELY.

—

WASHINGTON, Nov. 21, 1836.

COLONEL,—The enclosed report of Lieutenant Scott, which I have the honor to submit, fully confirms the high estimate I had formed of Mr. Cochran's gun, from the experiments instituted by me, on Saturday, in conformity with your instructions.

Under my supervision, the gun was loaded and discharged five hundred times; the results proving its great accuracy, safety, and facility of loading and firing. My attention was particularly called to the apparent danger of ignition, from the contiguity of the charges. But, from the experiments freely made by Mr. Cochran, by placing loose powder in the chambers over the balls, and around the caps, I am convinced that my apprehensions were unfounded.

I do not hesitate to say, that with my closest scrutiny, I could not discover any objections to Mr. Cochran's invention. It will be well to remark, that the gun was discharged in all, one thousand and eight times, without being cleaned, and without missing fire.

The flattened balls accompanying this, were fired through an inch-plank against a brick wall, at a distance of 150 yards.

I am, Sir, very respectfully,
Your Obe't. Ser't.
(Signed) GEO. D. RAMSAY.
Capt. of Ordnance.

COL. T. BOMFORD, U. S. Ordnance.

For Mr. Cochran, with the compliments of GEO. D. RAMSAY.

—

WASHINGTON ARSENAL, Nov. 22, 1836.

SIR,—Having been present at the test of the gun with revolving Cylinders, invented by you, and being a witness to the many experiments, which were made on Saturday, the 19th inst., at this place, I can but attempt to express the great satisfaction it afforded me, to see the following successful trials made by you:

Firstly, As a smooth-bored gun, in regard to the accuracy with which it shoots a ball, I must say that nothing of the kind, that has heretofore come under my observation, can be compared with it; for at a distance of fifty yards, the size of a dollar was struck three times in succession.

Secondly, When the comparison (or rather contrast) was made between your gun and Hall's Carbine, as to the depth of penetration into pine wood, I was most astonished to see the great difference between the two: At the distance of fifty yards, your gun, the first shot, penetrated 4 inches, the second shot, 3 inches and 8-tenths, the third shot, 3 inches and 8-tenths; whilst Hall's Carbine at the distance of fifteen yards, only penetrated 2 inches and 8-tenths.

Thirdly, As to the speed with which it was fired, while Hall's Carbine could only be loaded once, your Gun completely discharged its Cylinder containing nine charges, in the space of six seconds.

Fourthly, As to the certainty of discharge, in firing 1008 charges, not one cap failed, and when double shotted, and fired, no recoil was perceptible.

In fact, your gun, for simplicity, accuracy, and certainty, together with its other inestimable qualities, is, in my opinion, beyond improvement, and may be called a most complete fire-arm.

With very great respect,
I am, Sir,&c.,
JOHN M. ST. JOHN,
Master Armorer, &c., Washington Arsenal.
To JOHN COCHRAN, Esq.,
Brown's Hotel, Washington City.

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The piece was fired this morning 500 times, making in all 1008. It is in the same order it was previous to the discharging it. Water was put into the chambers,